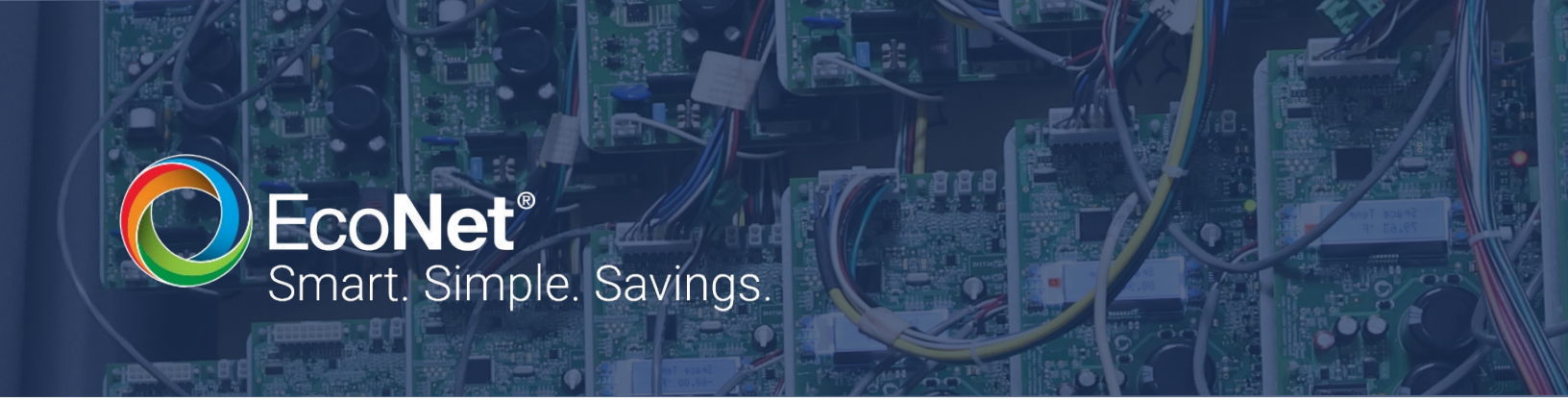


TROUBLESHOOTING GUIDE

ECONET ENABLED UNIT COOLERS

HTPG

CONTENTS

INTRODUCTION

EcoNet Enabled Unit Coolers are intelligent, electronically operated evaporators for walk-in coolers and freezers designed for easier installation and energy savings. Developed in conjunction with Rheem Manufacturing, it builds on the success, reliability, and efficiency of the EcoNet technology and brings it to commercial refrigeration.

EcoNet Enabled Unit Coolers save energy in refrigeration systems through precise superheat and space temperature control, fan cycling, and controlling how often the system goes into defrost based on compressor runtime.

It eliminates unnecessary defrosts, maximizes energy efficiency with less compressor runtime, reduces liability by eliminating icing issues, reduces fan speed to 50% during off cycle to save energy, and reduces temperature fluctuations by regulating defrosts for improved product quality. EcoNet Enabled Unit Coolers can be configured to work on a single or dual evaporator coil and can be used with a condensing unit in single and multiple evaporator installations as a group.

ECONET BOARD

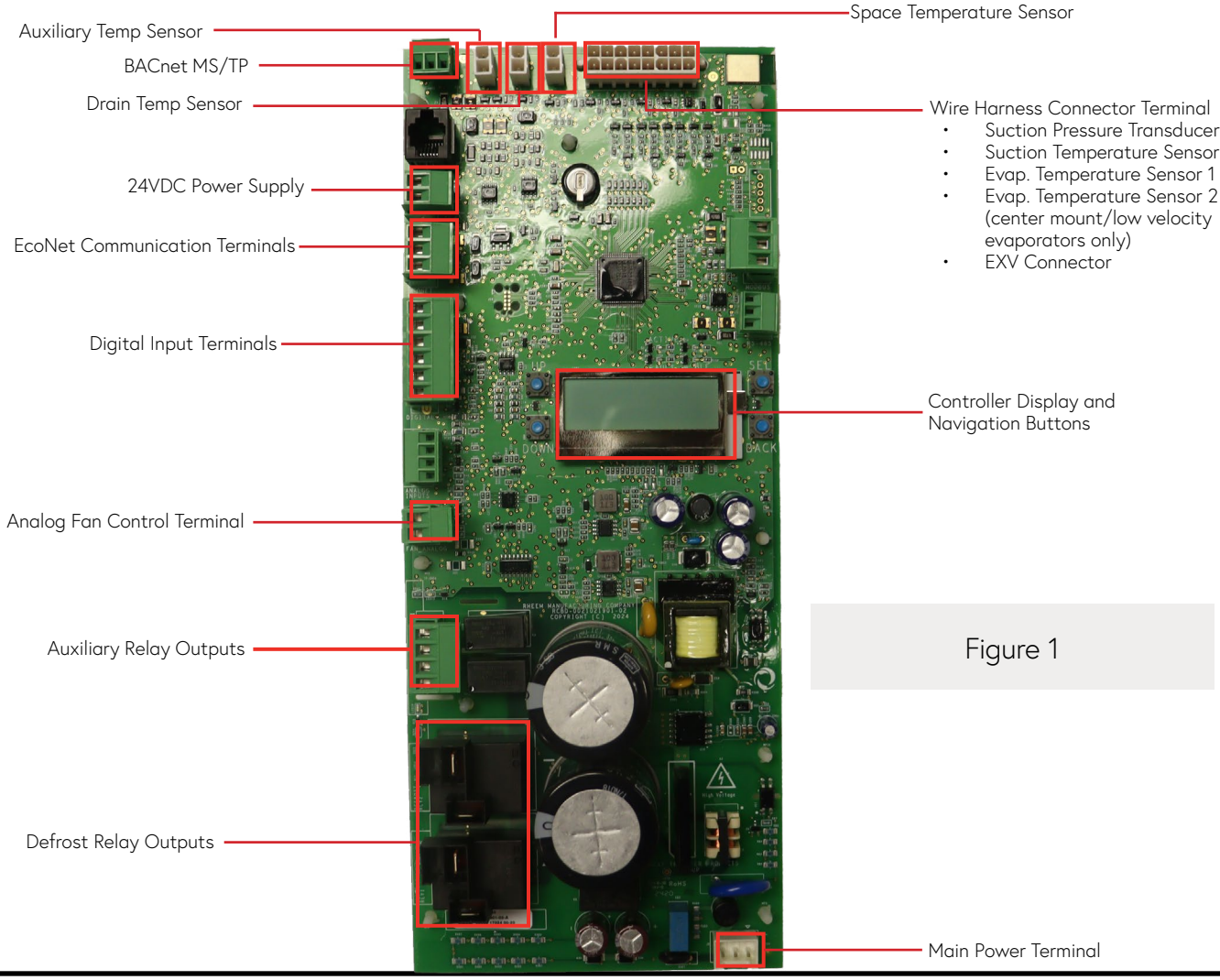


Figure 1

SAFETY CONSIDERATIONS

Failure to read and follow all instructions carefully before installing or operating this control and system could cause personal injury and/or property damage.

NOTES: All wiring must comply with national, local, and state codes

- **Before service, power to the unit should be disconnected per proper lockout procedures.**
- **After power is disconnected wait 5 minutes before touching the board for power stored to fully discharge.**
- **The control board has no user serviceable parts, do not try to repair.**
- **Do not wire the control board while powered.**
- **If the board becomes corroded replace immediately. Cleaning of the control board is not recommended.**

PROBLEM	POSSIBLE CAUSE	SOLUTION
EcoNet Controller does not turn on.	No power to controller	Ensure power harness is connected to controller board. Use a voltmeter to verify that proper voltage (115 or 230 VAC) is present on terminal board (L1, L2) on evaporator.
	Controller board could be damaged	Inspect controller board for visual signs of damage (discoloration, burn marks, broken components, etc.). If damaged, replace controller board.
Controller turns on but display is missing lines or blank.	Controller board display is damaged.	Replace controller board.
One or more fans are not running.	No power to controller.	Ensure power harness is connected to controller board. Ensure power is connected to terminal board (L1, L2, GND) on evaporator.
	One or more fan wires are disconnected.	Verify fan wiring diagram on unit and ensure that fans are wired to controller: WHITE wire to L2, BLACK wire to Aux Relay 1 on controller board, RED wire to Aux Relay 2 on controller board. Verify wires from Aux Relays 1 and 2 are connected to L1 on terminal board. Verify each of the EC fan motors has all the wires connected (WHITE, BLACK & RED). Verify Aux Relay status: when Aux 1 Relay is ON, fans run at full speed; when Aux 1 and Aux 2 Relays are both ON, fans run at half speed. LED will turn ON next to each relay on controller board to indicate relay is active. User can also verify Aux Relay 1 and 2 status via display under ***Status→Outputs→Aux Relay #1/Aux Relay #2.***
	Fan motor could be damaged.	Replace fan motor.
	Fan blades could be obstructed.	Verify fan blades and fan guards are free of obstruction.

PROBLEM	POSSIBLE CAUSE	SOLUTION
None of the fans are running.	EcoNet controller could be manually disabled; System Enabled is set to NO in the controller settings.	On controller display, go to ***Settings→System Enabled*** and ensure it is set to YES.
	Fan Control setting is set to Analog	On Unit Coolers (not Packaged Refrigeration Units) with dual speed fan motors, make sure that Fan Control Cnfg. is set to "Relays" ***(Settings→Equipment→Basic→Fan Control Cnfg.),*** and ***Aux Relay Cnfg***. is set to "Fan Control" ***(Settings→Equipment→Aux Relay Control→Aux Relay Cnfg.)***
	During an active cooling cycle, Evap Temp 1 temperature is not cold enough (on Single Coil units); Evap Temp 1 and Evap Temp 2 temperatures not cold enough (on Dual Coil units).	During an active cooling cycle (EEV is open), controller is waiting on Evap Temp 1 (and Evap Temp 2 on Dual Coil units) to get below Fan Delay Temp setting before allowing fans to run. If unit is set to FREEZER, Evap Temp has to get below 35°F for fans to run; if unit is set to COOLER, Evap Temp has to get below 55°F for fans to run. Verify Aux Relay status: when Aux 1 Relay is ON, fans run at full speed; when Aux 1 and Aux 2 Relays are both ON, fans run at half speed. LED will turn ON next to each relay on controller board to indicate relay is active. User can also verify Aux Relay 1 and 2 status via display under ***Status→Outputs→Aux Relay #1/ Aux Relay #2.***
	If unit is set to Freezer, it could be defrosting.	Wait for defrost cycle to finish.
	If unit is set to work in Lead-Lag, it could be disabled by Manager.	On controller display, confirm under ***Status→Lead Lag→Disable Command.*** If Disable Command reads "Yes", wait for Compressor Run Limit Hours at Manager controller to expire for unit to become active and start a cooling cycle.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Fans run but never go to half speed	Half speed fan wire (RED) could be disconnected/ loose.	Verify fan wiring diagram on unit and ensure that RED wire is connected to Aux Relay 2 on controller, and connected to every fan motor. Verify wire from Aux Relay 2 is connected to L1 on terminal board. Fans should go to half speed when box temperature setpoint is satisfied. Verify Aux Relay 2 status via LED on controller next to the relay connectors, and via display under ***Status→Outputs→Aux Relay #2.***
	Unit has single-speed 3-phase fan motors installed. (Only applicable to Warehouse unit coolers)	Verify if the unit installed has single-speed 3-phase fan motors. These fan motors operate at full speed only or OFF. There will not be a wire connected to Aux Relay #2.
Fans run but never go to full speed	Setpoint is satisfied	Verify Setpoint and Space Temp reading. If Space Temp is higher than Setpoint plus the Setpoint Control differential, allow the 2 minute minimum off time to finish for cooling to start again.
	Evap Temp is not low enough	During an active cooling cycle (EEV is open), verify Evap Temp 1 (and also Evap Temp 2 on Center Mount units) gets cold enough (under 35F for Freezer, under 55F for Cooler). If Evap Temp has not dropped below Fan Delay Temp setting (compressor not running, malfunctioning Evap Temp sensor), the fans will remain off initially, then run at 50% speed after one hour.
	Aux Relay Config. setting is not configured correctly	On Unit Coolers (not Packaged Refrigeration Units) with dual speed fan motors, make sure that ***Fan Control Cnfg.*** is set to "Relays" ***(Settings→Equipment→Basic→Fan Control Cnfg.),*** and Aux Relay Cnfg. Is set to "Fan Control" ***(Settings→Equipment→Aux Relay Control→Aux Relay Cnfg.)***
	Aux Relays could be damaged	Verify that there is no visible damage or burn marks on the Aux Relays. Verify the status of each Aux Relay via the LED next to each one, via display under ***Status→Outputs→Aux Relay #1/Aux Relay #2.*** Relay operation for fan speed control is as follows: Aux Relay #1 ON = Full Speed; Aux Relays #1 & #2 ON = Half Speed; Aux Relays #1 & #2 OFF = Fans off. If damage on the Aux Relays is visible, replace controller.
	Fan motors could be malfunctioning	If Aux Relays do not look damaged, confirm that Aux Relay #2 is OFF (visually inspect LED is off, status on display indicates OFF). Power off unit and temporarily disconnect the red wire from Aux Relay #2. When unit is powered back on, verify fan speed when Aux Relay #1 turns on. If fan motors are still running at half speed, proceed to troubleshoot/ replace fan motors. Reconnect red wire when finished.

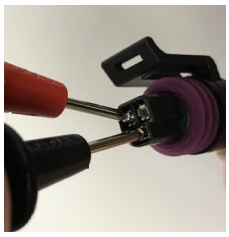
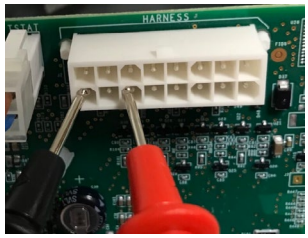
PROBLEM	POSSIBLE CAUSE	SOLUTION
Unit is not cooling.	No power to controller.	Ensure power harness is connected to controller board. Ensure power is connected to terminal board (L1, L2, GND) on evaporator.
	Controller could be manually disabled; System Enabled is set to NO in the controller settings.	On controller display, go to ***Settings→System Enabled*** and ensure it is set to YES to start a cooling cycle and open EEV.
	Space Temp sensor is disconnected.	If the controller detects that the ***Space Temp*** sensor input is missing, it will attempt cooling operation at fixed intervals based on previously calculated runtime averages until the sensor is replaced. Also, while the sensor is disconnected, Space Temp will read "-60 ^{0}F" and a ***"A103 Space Temp Thermistor Failure"*** alarm will be generated (viewed on the display under ***Service→Current Alarms***). Replace the Space Temp sensor as soon as possible to resume normal cooling operation based on the configured Setpoint. (Part no. 08219623)
	Controller could be enabled, but EXV is not opening.	Verify EXV is properly connected to wire harness. Verify wire harness is not damaged. Verify on wire harness connection at the controller that no wires have come loose from the connector. Verify that controller is commanding EXV to open by looking at the display under ***Status→EXV→EXV Current Pos.*** To do a quick verification if the valve is working, a) disconnect power to the controller and wait for audible/tactile feedback from the EXV (controller will force valve to close completely when power is disconnected), reconnect power to the controller and wait for audible/tactile feedback from the EXV when the controller wakes up and attempts to recalibrate the valve; OR b) go to ***Settings→System Enabled*** and set it to NO, set System Enabled back to YES, and wait a couple of minutes to listen/feel for EXV movement (valve should open if Space Temp Setpoint is not satisfied). To verify EcoNet EXV Operation on pages 22-23
	If unit is set to work in Lead-Lag, it could be disabled by Manager.	On controller display, confirm under ***Status→Lead Lag→Disable Command.*** If Disable Command reads "Yes", wait for Compressor Run Limit Hours at Manager controller to expire for unit to become active and start a cooling cycle.

PROBLEM	POSSIBLE CAUSE	SOLUTION
EXV is operating, but it is holding at 15% position and unit is not cooling.	Compressor is not running	Verify Suction Pressure reading on the display under ***Status→Sensors→Suction Pressure***. If the system is charged properly, the Suction Pressure reading should start increasing as soon as the valve opens. If Suction Pressure keeps climbing and never drops, the compressor is likely not running. Verify at the condensing unit if the compressor is running. Verify that power to the condensing unit is turned ON. Verify that the cut-in/cut-out pressure switches at the compressor are set properly for the refrigerant being used (refer to condensing unit installation manual).
	Compressor could be short cycling repeatedly	Compressor could be prematurely cycling off on low pressure before the EXV has had a chance to open up more beyond its initial position. Adjust ***EXV Last Pos. Min.*** and ***EXV Last Pos. Max.*** settings to a higher value. Set ***System Enabled*** to ***No*** to force a valve closure so the controller can record a new valve position for opening on the next cooling cycle attempt. Set ***System Enabled*** back to ***Yes*** and wait for the 2 minute minimum off timer to expire. The controller will open the valve again to the new recorded last position. The ***EXV Startup Delay*** setting can also be adjusted if necessary to hold this position for a longer or shorter period before the valve starts modulating for superheat control.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Unit is cooling but Space Temp never reaches setpoint.	Door is open.	Close door to the box. Make sure door remains closed unless/until access to box is needed. Verify that there are no air gaps and that the box is properly sealed.
	System could be undercharged/leak present in the system.	Verify at controller display the current superheat and valve position; go to ***Status→EXV→EXV Current Pos.*** and ***Status→EXV→Superheat.*** If superheat is consistently high and valve is consistently running at or close to 100%, the system could be low on refrigerant. Verify if sight glass at condensing unit is clear. Verify suction pressure with a set of gauges. Recharge system as needed, verify if any leaks are present and fix as needed.
	Compressor could be shutting down intermittently.	Verify at condensing unit if compressor is shutting down intermittently. Troubleshoot condensing unit and verify if high head pressure, phase loss, etc.
Unit is cooling but box gets too cold beyond configured Setpoint	Not enough load, or system could be oversized	During an active cooling cycle, the controller will continue cooling for the configured 5 minute **Cmp. Min. Run Time**, regardless of Space Temp. After the 5 minutes expire, the cooling cycle will end and the system will pump down. If the controller is overshooting the Setpoint, try changing the ***Cmp. Min. Run Time*** to either 4 or 3 minutes ***(Settings→Equipment→Basic→Cmp.Min Run Time)***. Also, running a higher superheat setpoint might help slow down the rate of cooling in the box.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Suction line at compressor is icing up excessively.	Verify that the correct refrigerant is selected.	Verify under the controller settings that the correct refrigerant is selected. On the display, go to ***Settings→Equipment→Basic→Refrigerant***. An incorrect refrigerant setting will cause incorrect superheat calculation and the system will not operate properly.
	Suction Temp sensor disconnected (controller will alarm; red LED on controller will be blinking), or sensor could be malfunctioning/reading erratic value.	Verify if Suction Temp Thermistor alarm is active: on controller display go to ***Service→Current Alarms***. Also verify Suction Temperature reading under ***Status→Sensors→Suction Temp***; if it is reading "-60 ^{0}F", the sensor is not making good contact or is missing. If Suction Temp sensor input is missing, the EXV will remain at a fixed position until sensor is replaced, and alarm "***A100 Suction Temp Thermistor Failure***" will be active. If sensor is reading a value other than "-60 ^{0}F", verify that it is not an erratic value and that the reading reasonably corresponds to the conditions at the evaporator (for example, if sensor is reading 150 ^{0}F when the suction line at the evaporator is near freezing conditions). Replace Suction Temp Thermistor (part no. 08219637).
	Suction Pressure transducer disconnected, or transducer could be malfunctioning/reading erratic value.	Verify if Suction Pressure alarm is active: on controller display go to ***Service→Current Alarms***. Also verify Suction Pressure reading under ***Status→Sensors→Suction Pressure***; if it is reading "-14.7 PSIG", the sensor is malfunctioning or is disconnected. If the controller detects that the pressure input is missing, alarm "***A106 Suction Pressure Sensor Failure***" will be active and the red LED above the display will be flashing to indicate active alarm. The controller will attempt to calculate approximate superheat by using Evap Temp 1 reading instead of Saturated Suction Temp and continue metering the EXV, but the calculated superheat will not be as accurate. Replace Suction Pressure Transducer (part no. 08219621).
		Inspect wire harness for visible wire damage. Replace harness if damaged. Refer to page 48 of EcoNet Installation Manual for wire harness replacement part numbers.
		Verify +5VDC power supply from controller to pressure transducer. Disconnect pressure transducer from harness. Use a voltmeter to measure DC volts between RED and GREEN wires on the harness connector as shown below. Alternatively, DC volts can be measured between the 1st and 3rd pins from left to right on the bottom row of the board connector as shown below. If voltmeter is reading a different value than +5VDC, replace EcoNet controller (part no. 08536930). **SEE IMAGES BELOW FOR REFERENCE**
	EXV selection not configured correctly.	Verify EXV Stepper Type setting matches the valve that is installed. Select 2500 Bi-Polar for Sporlan SER valve. Select 500 Uni-Polar for Sporlan OEV valve. Select 480 Bi-Polar for Carel E2V, E3V or E4V.



PROBLEM	POSSIBLE CAUSE	SOLUTION
Suction line at compressor is icing up excessively.	Verify EXV is functioning properly, closing completely for pumpdown.	Verify harness connection to the EXV and to the controller board is secure. Set System Enabled to NO, under ***Settings→System Enabled*** in order to close the EXV and force a pumpdown. Confirm that the EXV can be heard moving as it closes. Confirm EXV position under ***Status→EXV→EXV Current Pos.*** is 0%. Verify that compressor pumps down and shuts off after a couple of minutes; Suction Pressure reading under ***Status→Sensors→Suction Pressure*** should decrease as the system pumps down. If the compressor is still running and does not turn off, the EXV may be malfunctioning and allowing some refrigerant to pass through even after being commanded by the controller to close. **Please reference the end of the document for more information**. Replace EXV if necessary.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Evaporator coil is icing up (Coil Type = Single, Freezer)	Door is being left open.	Make sure door to the freezer is kept closed unless/until access to freezer is needed.
	Verify that heaters are working when controller goes into defrost.	Verify that the controller is set to ***Freezer*** and ***Coil Type = Single***. Manually start a defrost to verify the heaters are energized and operating properly. A manual defrost can be started by going on the display to ***Service→Defrost Control→Start a Defrost***. Verify at the controller board that the LEDs for the defrost relays turn ON and their status is ON on the display (***Status→Outptus→Defrost Relay #1/#2***). If the unit is a Low Profile evaporator, make sure that Coil Type is set to "Single" (go to ***Settings→Equipment→Basic*** and scroll down to verify these parameters), and that Evap Temp 1 sensor is connected and having a valid reading. If Evap Temp 1 sensor is disconnected, the controller will alarm ("***A101 Evaporator Temp Sensor Failure***") and the Defrost Relays will not turn ON. If ***Coil Type*** is mistakenly set to ***Dual,*** the controller will alarm ("***A102 Evap Temp 2 Thermistor Failure***") and the missing Evap Temp 2 sensor will prevent Defrost Relay #2 from turning on; this would keep the top and bottom heaters from turning on during a defrost and will cause ice build up on the coil. If both Defrost Relays are turning ON, verify with a meter that the heaters are drawing amps and are warming up; if they are not, verify the heater wiring with the wiring diagram at the evaporator. If the heaters are wired properly but still not heating, they may need to be replaced.
	Evap Temp 1 sensor may be reading too high	If ***Evap Temp 1*** sensor is damaged and giving erroneous reading (too high), the controller may register a valid reading (not "-60F") but the sensor input may reach Defrost Termination Temp too soon, thus ending the electric defrost cycle prematurely. Please refer to the resistance table for the Evap Temp sensor on page 49 of the EcoNet Installation Manual. If the sensor is suspected to be giving incorrect reading, it must be replaced (part no. 08219636).
	Verify duration of defrost cycle/runtime between defrosts.	If the heaters are verified to be working properly, proceed to verify defrost cycle duration: on the controller display, go to ***Status→Defrost→Last Defr. Time***. Also, force a defrost and wait for it to finish to take note of the duration. Low Profile Evaporators typically need between 20 to 30 minutes defrost duration to clear the ice. If the defrost cycle is too short, the Defrost Termination Temperature (***Def. Term. Temp***) and Runtime Until Defrost (***Def. Cmp. Run Time***) can be adjusted as needed in ***Settings→Equipment→Defrost.*** Also, Defrost Relay #1 (Drain Pan heater) can remain on for the duration of the defrost cycle by setting Defrost Relay 1 Control to "No Pulse Relay 1" if needed. If the unit already has some ice built up in the coil, it may take several defrost cycles to clear the ice after the parameters mentioned above are adjusted.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Evaporator coil is icing up (Coil Type = Dual, Freezer).	Door is being left open.	Make sure door to the freezer is kept closed unless/until access to freezer is needed.
	Verify that heaters are working when controller goes into defrost.	Verify that the controller is set to ***Freezer*** and ***Coil Type = Dual***. Manually start a defrost to verify the heaters are energized and operating properly. A manual defrost can be started by going on the display to ***Service→Defrost Control→Start a Defrost.*** Verify on the controller board that the LEDs for the defrost relays turn ON and their status is ON on the display (***Status→Outptus→Defrost Relay #1/#2***). If the unit is a Center Mount evaporator, make sure that ***Coil Type*** is set to ***"Dual"*** and that Evap Temp 1 and Evap Temp 2 sensors are connected and having a valid reading. If Evap Temp 1 sensor is disconnected, the controller will alarm (***"A101 Evaporator Temp Sensor Failure"***) and Defrost Relay #1 will not turn ON; if Evap Temp 2 sensor is disconnected, the controller will alarm (***"A102 Evap Temp 2 Thermistor Failure"***) and Defrost Relay #2 will not turn ON. If the Defrost Relays are turning ON, verify with a meter that the heaters are drawing amps and are warming up; if they are not, verify the heater wiring with the wiring diagram at the evaporator. If the heaters are wired properly but still not heating, they may need to be replaced.
	Verify Evap Temp 1 and Evap Temp 2 sensor locations.	On Center Mount evaporators (***Coil Type = Dual***), both Evap Temp 1 (white wires) and Evap Temp 2 (blue wires) are used for defrost termination. During a defrost cycle, when Evap Temp 1 sensor reaches Defrost Termination Temp, the Defrost Relay #1 will turn off. Same for Evap Temp 2 with Defrost Relay #2; each side will terminate defrost independently. Verify with the wiring diagram on the unit that Evap Temp 1 sensor is located on the coil whose heaters are wired to Defrost Relay #1. Same goes for Evap Temp 2, it should be located on the coil whose heaters are wired to Defrost Relay #2.
	Verify duration of defrost cycle/runtime between defrosts.	If the heaters are verified to be working properly, proceed to verify defrost cycle duration: on the controller display, go to ***Status→Defrost→Last Defr. Time***. Also, force a defrost and wait for it to finish to take note of the duration. Center Mount Evaporators typically need between 20 to 30 minutes defrost duration to clear the ice. If the defrost cycle is too short, the Defrost Termination Temperature (***Def. Term. Temp***) and Runtime Until Defrost (***Def. Cmp. Run Time***) can be adjusted as needed in ***Settings→Equipment→ Defrost.*** If the unit already has some ice built up in the coil, it may take several defrost cycles to clear the ice after the parameters mentioned above are adjusted.
Evaporator coil is icing up (Coil Type = Dual, Freezer).	Evap Temp 1 or Evap Temp 2 sensor may be reading too high	If ***Evap Temp 1 or Evap Temp 2*** sensor is damaged and giving erroneous reading (too high), the controller may register a valid reading (not "-60F") but the sensor input may reach Defrost Termination Temp too soon, thus ending the electric defrost cycle prematurely. Please refer to the resistance table for the Evap Temp sensor on page 49 of the EcoNet Installation Manual. If the sensor is suspected to be giving incorrect reading, it must be replaced (part no. 08219636).

PROBLEM	POSSIBLE CAUSE	SOLUTION
Evaporator Coil is steaming excessively during a defrost; water droplets accumulating on the ceiling (Low Profile and Center Mount FREEZER units).	Defrost cycle is running too long	Verify last defrost cycle duration under ***Status→Defrost→Last Defr. Time***, and/or force a defrost manually and time it to verify duration. Low Profile and Center Mount evaporators should not defrost for longer than 30-35 minutes. Adjust Defrost Termination Temperature (***Def. Term. Temp***) down as needed, and also adjust the Maximum Defrost Time (***Def. Max Run Time)*** down from the 60 minute default setting if needed.
EcoNet Controller generates alarm ***"A104 Drain Temp Thermistor Failure"***	***Defrost Relay 1 Control*** is configured to "DrainPan Defrost" under Settings and Drain Temp sensor is not connected.	If no Drain Temp sensor is installed, controller will keep Defrost Relay #1 (drain pan heater) ON continuously for duration of the defrost cycle. If the Drain Pan Heater pulsing option is to be used on Low Profile evaporators with electric defrost, make sure the sensor is reconnected or replaced (part no. 08219623) and ***Def. Relay 1 Control*** is configured to ***DrainPan Defrost;*** if no Drain Temp sensor is present, make sure that the ***Def. Relay 1 Control*** setting is set to ***No Pulse Relay 1.***
EcoNet Controller generates alarm "***A105 Aux Temp Thermistor Failure***"	Aux Temp Sensor is configured to YES under Settings and sensor is not connected.	Go to ***Settings→Equipment→Aux Relay Control→Aux Sensor?*** and make sure it is configured to NO.
EcoNet Controller generates notification "***T001 Defrost Failure: Max Time Expired" (Freezer setting only)***	Evap Temp 1 sensor may be disconnected (***Coil Type = Single***)	If ***Coil Type = Single***, verify ***Evap Temp 1*** is getting a valid reading. If the Evap Temp sensor is disconnected, the ***Evap Temp 1*** reading will show "-60F" and the Defrost Relays will not turn on. Reconnect/replace the sensor. See also segment above on ***Evaporator Coil is icing up (Coil Type = Single, Freezer)*** for electric heater functional troubleshooting.
	Evap Temp 1 or Evap Temp 2 sensor may be disconnected (***Coil Type = Dual***)	If ***Coil Type = Dual,*** verify ***Evap Temp 1 & Evap Temp 2*** are both getting a valid reading. With Coil Type set to Dual, if Evap Temp 1 sensor is disconnected, Defrost Relay 1 will not turn on, and if Evap Temp 2 sensor is disconnected, Defrost Relay 2 will not turn on. Reconnect/replace the sensor(s). See also segment above on ***Evaporator Coil is icing up (Coil Type = Dual, Freezer)*** for electric heater functional troubleshooting.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Multiple evaporators present in the same box, but one or more of them are not cooling/operating in sync.	EcoNet controller may not be addressed properly to work as part of the group.	Verify each controller that is intended to work in the group is addressed properly. On each controller display, go to ***Settings→Group-Member Cfg***. to set the address. Group 1 Leader will be G1-L, Group 1 Follower #2 will be G1-2, Group 1 Follower #3 will be G1-3, etc. Same for Groups 2, 3 and 4. Each group will support a maximum of 6 evaporators (1 Leader + 5 Followers). Make sure that there are no conflicting addresses set between two or more controllers.
	EcoNet controller may not be wired properly to the rest of the group.	Verify that the communication wire used is at least ***22 gauge, shielded.*** Verify each of the 3 conductors are terminated at each board on E1, E2 and RT terminals and that polarity is maintained from board terminal to board terminal (a wire landed at E1 on the first board has to go to E1 on every other board on the daisy chain; same for E2 and RT). Verify that the shielding strands are connected at every splice and terminated at a ground point on one end of the daisy chain only.
	One or more controllers in the group may be manually disabled.	Verify on each controller in the group that ***System Enabled*** is set to YES. Go to ***Settings→System Enabled*** and verify that all the controllers in the group are set to YES.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Time stamp on the Alarm History is not accurate.	Time clock on controller may not have been set.	If time clock on controller is not set, the controller may generate the "***A502 Time Clock needs to be programmed"*** alarm. Go to ***Settings→Time and Date*** on each controller board display to set the controller time clock. If you have a Command Center Display wired to one or more controller boards, the time clock can be set there and it will be simultaneously broadcast to every controller connected.
	Time clock on controller may have been set at install, but a prolonged power loss may have reset it.	If the controller board remains powered off for more than a couple of days, the time clock will have to be reset. Go to ***Settings→Time and Date*** on each controller board display to set the controller time clock. If you have a Command Center Display wired to one or more controller boards, the time clock can be set there and it will be simultaneously broadcast to every controller connected.
Command Center Display screen is blank.	Make sure that Command Center Display is connected to a power supply.	If installing Command Center within 150 feet of the nearest EcoNet controller, make sure that the wires from the R and C terminals at the Command Center mounting bracket are securely connected to the 0V and 24V terminals at the controller. Make sure the controller is powered on. If Command Center is installed more than 150 feet away from nearest controller, make sure it is connected to a separate 24VAC or 24VDC power supply. Please refer to the Command Center wiring diagram on the Command Center/Web Portal Installation & Operations Manual.
	Command Center Display could be damaged.	Inspect the Command Center Display for signs of damage (cracked screen, burn marks on the circuit board/ mounting bracket, broken components). If damaged, replace the Command Center Display. Make sure that the Command Center is installed indoors, outside of the walk-in cooler/freezer, and that it does not get wet or dropped.

PROBLEM	POSSIBLE CAUSE	SOLUTION
	Some Evaporator Controllers in the network bus may not be powered on.	Make sure that every evaporator controller in the daisy chain network is powered on.
	Possible conflict of addresses on the network.	Make sure all controllers on the daisy chain network are powered on and properly addressed so the Command Center can find them. Every EcoNet board on the daisy chain must have a unique address set. For Group Leaders and Followers, the address is set at each controller under ***Settings→Group-Member Cfg***. For standalone units on the daisy chain, the address is set at each controller under ***Settings→Network Instance.***
Command Center Display turns on and is able to communicate with some controllers, but not with others on the daisy chain network.	Make sure that communication wires between Command Center Display and EcoNet controller are properly connected.	Make sure that communication wires from E1 and E2 terminals at the Command Center mounting bracket are securely connected at the E1 and E2 terminals respectively on the first controller board in the daisy chain. Make sure that the communication wire is securely connected to the E1, E2 and RT terminals between every controller board, and that the wires are not crossed from terminal to terminal. Make sure that at least ***22 gauge, shielded wire*** is used and the shielding strands are tied together at every splice and tied to a ground point at one end of the daisy chain only. Make sure all controllers on the daisy chain network are powered on and properly addressed so the Command Center can find them. Please refer to the Command Center wiring diagram on the Command Center/Web Portal Installation & Operations Manual for how to daisy chain multiple controllers together with a Command Center Display.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Manager and Partner (as standalone units) cannot sync up for Lead/Lag setup	Incorrect wiring	Connect 18-22 AWG shielded wire between the two controllers at the EcoNet communication port. Please refer to page 42 of the EcoNet installation manual for Lead Lag controller wiring.
	Conflicting network instances	At the designated Partner controller, set the ***Network Instance*** by navigating to ***Settings→Network Instance***. At the designated Manager controller, set the Network Instance by navigating to ***Settings→Network Instance*** (must be different than Partner controller). Also, at the designated Manager controller, configure the ***Partner Instance*** number (must match Network Instance setting that was configured on designated Partner controller).
	Incorrect configurable settings	At the designated Manager controller, set ***Lead/Lag Select*** to "Manager", then set ***Partner Instance*** to match the Network Instance setting of the designated Partner controller. Once they link up, the Partner controller will have its ***Lead/Lag Select*** setting automatically set to "Partner" by the Manager.
Manager and Partner groups cannot sync up for Lead/Lag setup	Incorrect wiring	Connect 18-22 AWG shielded wire in a daisy chain pattern at the EcoNet communication port between all the controllers of both groups. Please refer to page 44 of the EcoNet installation manual for Lead Lag controller wiring.
	Conflicting network instances	Configure the Manager and Partner groups by setting ***Group Member Cfg.*** at each controller. Manager Group must be different than Partner Group (i.e. Group 1 for Manager, Group 2 for Partner). Please refer to Group Operation on page 26 of the EcoNet manual on how to wire and configure each group.
	Incorrect configurable settings	At the designated Manager Group Leader, set ***Lead/Lag Select*** to "Manager", then set ***Partner Instance*** to match the Group number of the Partner (i.e. if Manager is Group 1 and Partner is Group 2, on G1-L controller configure ***Lead/Lag Select*** to Manager and ***Partner Instance*** to G2). Once both group leaders link up, the Partner Group Leader will have its ***Lead/Lag Select*** setting automatically set to "Partner" by the Manager Group Leader.

PROBLEM	POSSIBLE CAUSE	SOLUTION
Leak alarm active when Digital Input #2 displayed on Status screen as OFF. Likewise, if leak alarm is NOT active when Digital Input #2 displayed on Status screen as ON.	Leak switch configured to normally closed (N.C.)	If leak detector needed for the system, the default setting for the leak switch should be normally open (N.O.) Navigate to ***Settings→Equipment→Digital Ins Cfg.→Leak SW.Config*** and set as N.O.
PACKAGED REFRIGERATION UNITS: Compressor does not run or cycles off prematurely	Aux Relay Config. setting configured incorrectly	Navigate to ***Settings→Equipment→Aux Relay Control→Aux Relay Config*** and verify that the Aux Relay Config setting is set to "Comp-Fan Control". This will set Aux Relay #2 to control the compressor on a Packaged Refrigeration Unit.
	Compressor contactor not pulling in	If Aux Relay #2 is on (LED visible), but contactor is not pulling in, verify that discharge pressure limit switch is not tripped.
	Incorrect Cut-Out Setpoint/ Cut-In Offset settings	For Low Temperature Packaged Refrigeration Units (Electric Defrost) set Cut-Out Setpoint to 0 PSIG, Cut-In Offset to 20 PSIG. For Medium Temp Packaged Refrigeration Units (Air or Electric defrost) set Cut-Out setpoint to 20 PSIG, Cut-In Offset to 20 PSIG. ***Settings→Equipment→Aux Relay Control→Cmp. Cut-Out Setpt/Cmp. Cut-In Offs.***

ECONET ALARMS & NOTIFICATIONS LIST

Non-critical Alerts

T001	Defrost Failure: Max Time Expired
T003	Door Open Alert

Critical Alarms

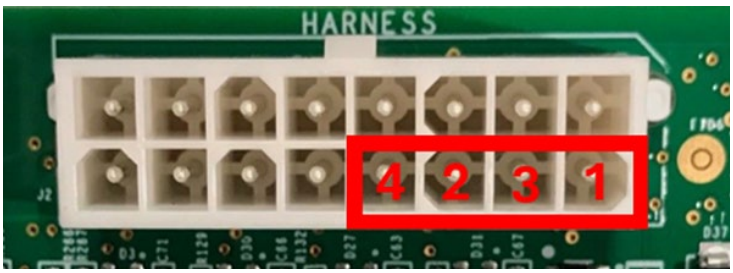
A004	Refrigerant Leak Detect Alarm
A005	Lead/Lag Communication Failure
A100	Suction Temp Thermistor Failure
A101	Evaporator Temp Sensor Failure
A102	Evap Temp 2 Thermistor Failure
A103	Space Temp Thermistor Failure
A104	Drain Temp Thermistor Failure
A105	Aux Temp Thermistor Failure
A106	Suction Pressure Sensor Failure
A108	Cooler/Freezer not Satisfying Setpnt. Alert
A500	Configuration Data Restore Failure
A502	Time Clock needs to be programmed
A503	Time Clock not advancing time properly

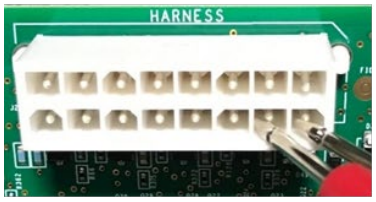
VERIFY CONTROLLER SIGNAL TO BI-POLAR VALVE

1 Verify that EXV Stepper Type is set to 2500 Bi-Polar at the controller display **(Settings→Equipment→Basic→2500 Bi-Polar)**

2 Disconnect wire harness connector from controller to expose the 4 pins that connect to the EXV cable

3 Using a voltmeter, place the test leads between each combination of pins 1 through 4 as shown in the pictures. Set the meter to measure DC volts. Set System Enabled = "No" **(Settings→System Enabled)**. Wait for the controller to drive the valve closed.

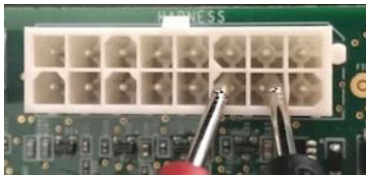




Pins 1 & 3

Pins 1 & 2

Pins 1 & 4


Pins 2 & 3

Pins 2 & 4

Pins 3 & 4

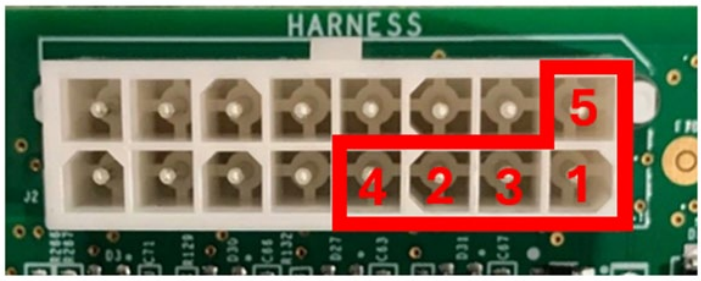
4 The voltmeter should read approximately 12V between at least two of the combinations of pins shown in the images above.

VERIFY CONTROLLER SIGNAL TO UNI-POLAR VALVE

1 Verify that EXV Stepper Type is set to 500 Uni-Polar at the controller display **(Settings→Equipment→Basic→500 Uni-Polar)**

2 Disconnect wire harness connector from controller to expose the 5 pins that connect to the EXV cable

3 Using a voltmeter, place the test leads between each combination of pins 1 through 4 as shown in the pictures. Set the meter to measure DC volts. Set System Enabled = "No" **(Settings→System Enabled)**. Wait for the controller to drive the valve closed.



Pins 5 & 1

Pins 5 & 3

Pins 5 & 2

Pins 5 & 4

4 The voltmeter should read approximately 12V between pin 5 and one of the other pins.

Step Motor Expansion Valves

Types SER-B, C, & D

Installation and Servicing Instructions

Operation

The Sporlan SER valve series are step motor operated electric expansion valves. Step motors are designed to provide discrete segments of angular motion, or rotation, in response to an electronically generated signal. The advantages of step motors in valve applications are high resolution, repeatability and reliability with low hysteresis. Feedback loops are not required, simplifying controller design and circuitry.

The step motor used in the SER valves is a 12-volt DC, two-phase, bi-polar, permanent magnet rotor type. Motor rotation is converted to linear motion by the use of a lead screw and threaded drive coupling. Forward motion of the motor extends the drive coupling and pin, which moves the valve to the closed position. Backward rotation of the motor retracts the drive coupling and pin modulating the valve in the opening direction. Full forward or backward travel, while the valve is assembled, is limited by the valve seat in the closed position or an upper stop in the open direction. A slight clicking or "ratcheting" sound may be heard at either of these two positions and does no harm to the valve or drive mechanism.

The valve will operate only when connected to a properly designed controller. The controller must supply the necessary square wave step signal at 12 volts DC and 200 PPS for the valve to control properly. Various Sporlan and third party controllers are available for use with the valve. Questions of suitability of a specific controller should be directed to the Sporlan Division, Parker Hannifin, Attn.: Product Manager — EEVs. Control algorithms for the valve include a initialization sequence that will first over-drive the valve in the closing direction. This is to assure that the valve is completely shut and to establish the "zero" open position. The controller then keeps track of the valve's position for normal operation. During this initialization phase, a light clicking sound may be heard, which will serve as proof of the valve's operation and closure.

Table 1

Valve Model	Cable Torque	Maximum Cable Length	Motor Phase Resistance (at 72°F)	Number of Steps	Maximum Internal Temperature During Install
SER-B SER-C SER-D	10-14 in.-lb.	40 feet	100 Ohms ±10%	2500	250°F

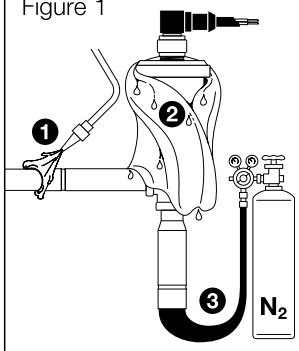
All valves are tight seating and uniquely characterized by pin and port combinations for exceptional control of refrigerant flow. The seats require no service and are not replaceable.

Installation

The Sporlan SER valve series are electronically controlled Step Motor Expansion Valves, and are installed before the distributor and evaporator just as one would install a Thermostatic Expansion Valve. The valves are bi-flow capable. Location should be planned to provide cable serviceability and to allow controller installation within the maximum cable length of forty feet. The valve may be installed in the refrigerated space and may be mounted in any position. For flexibility, the cable can be removed from the valve and re-positioned in any four configurations. See Table 1 for cable torque. Cable routing should avoid any sharp edges or other sources of potential physical damage such as defrost heaters and fan blades. For neatness and protection, the cable may be fastened to the suction or liquid lines with nylon wire ties.

The SER has copper connections and any solder or brazing alloy may be used to install the valve. The torch flame should be directed

Figure 1



1. Use proper torch tip, point away from valve.
2. Wrap valve body with wet rag.
3. Purge with inert gas, flow hot gas away from valve.

away from the motor housing and cable. See Figure 1. In order to maintain IP-67 rating on the cable interface, it is NOT recommended to remove cable during installation. If the cable is removed, take precaution to ensure water does NOT flow down into motor contact pins. Cable must be retightened to the specifications shown in Table 1. Care must be taken to assure that the cable is not damaged either directly from the flame, or indirectly from contact with hot piping. The valve is shipped in the open position to prevent heat being conducted into the motor, but it is strongly suggested that the valve body be wrapped with a wet cloth during the soldering operation. Valve internals **must not experience maximum temperature,** as shown in Table 1, during install. Inlet strainers are supplied optionally, and if used, should be oriented in the proper direction as shown on the strainer package. The valve should be completely installed before connecting to the controller and applying power. The wiring is color-coded and the controller manufacturer should be consulted for the proper attachment to the controller.

Field Servicing Instructions

1. If the valve fails to operate properly, obtain a digital multimeter and measure motor resistance. Resistance between the black and white leads or between the red and green leads should be as shown in Table 1. Note: Resistance values in the table are at 72°F. Using the same digital multimeter, measure resistance across black and red lead, or any lead and valve housing; resistance should be greater than 1 Mohm. If the resistance is less, the valve should be replaced.

2. If you have access to a SMA test instrument, operation of the valve may be proven. Connect the motor leads to the proper color-coded connector on the SMA. Set the rate to 200 PPS and toggle in the "OPEN" direction. After approximately 15 seconds, the driver should be fully retracted and a light clicking or "ratcheting" sound may be heard, this is normal to the valves and proves operation of the motor. If the SMA is toggled in the "CLOSE" position, after approximately 15 seconds the driver should be fully extended and a light clicking or "ratcheting" may be heard.

3. If the motor responds to step 2 above, the valve itself should be checked for obstruction. Check for contaminants in the port or strainer, if used.

4. If the port and strainer are clear and the motor operates as in step 2 above, the valve is considered operational and the problem lies in the controller or power supply. The manufacturer of these components should be contacted for further assistance.

Valve Replacement

The entire valve may be replaced if desired. The old valve may be unbrazed or cut out of the piping. If cut out, use a tubing or pipe cutter and not a saw. When installing the new valve any convenient brazing alloy and method may be used. The body and motor assembly should be wrapped with a wet cloth to prevent damage.

Cable can be removed while brazing. If not, extra care should be taken to prevent damage to the motor cable, either directly from the torch, or indirectly from contact with a hot surface. Refer to Installation section.

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